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Tomato Disease Control

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Figure 1.—Curly top virus kills tomato plants at all stages of growth.

COVER PHOTO — Healthy and vigorous tomatoes can be produced from treated seed and pastuerized soil.

TOMATO DISEASE CONTROL

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DISEASE CONTROL must be planned in advance because most disease control measures are preventive. A good **tomato disease control** program starts with clean, healthy plants and "clean" soil. Many of the more destructive and persistent soil-borne diseases of tomatoes can be controlled by obtaining or growing disease-free plants and keeping the soil free from disease-causing organisms. Once in the soil, many of these organisms persist indefinitely, or for long periods, causing diseases on many kinds of crop plants and weeds. Idaho soil was originally free from these organisms. **Keep your soils clean and maintain high production.**

DAMPING-OFF

Damping-off (fungi) causes seed decay and a watery, soft rot at the ground line resulting in toppling over and death of young seedlings.

Control

Buy or use hot-water-treated seed. Treat seed with one teaspoon Arasan or Phygon per pound of seed. Grow plants in virgin or pasteurized soil.

CURLY TOP

Curly Top (virus) is spread by the beet leafhopper (white fly) coming from its normal desert breeding grounds. The leaves of infected plants roll upward along the mid-rib and become thickened and crisp. The leaf tissue turns yellow while the veins often take on a purple color. The plants assume an erect habit, remain stunted and eventually die. In areas where curly top occurs, it can be the most destructive of all tomato diseases. Curly top has long been the chief factor limiting commercial tomato production in Idaho. (See Figure 1).

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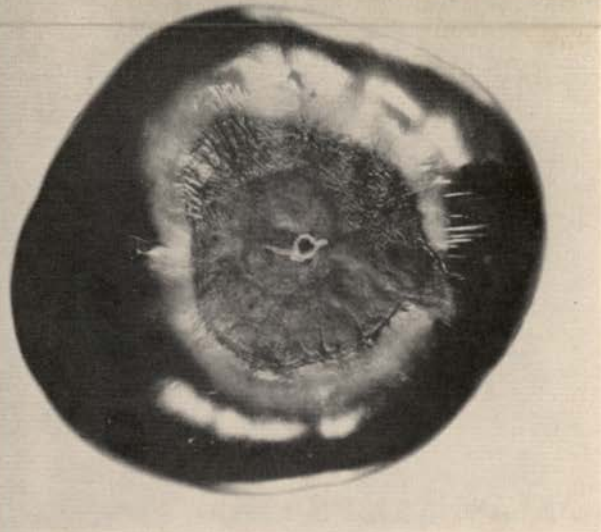


Figure 4.—Tomato blossom end rot.

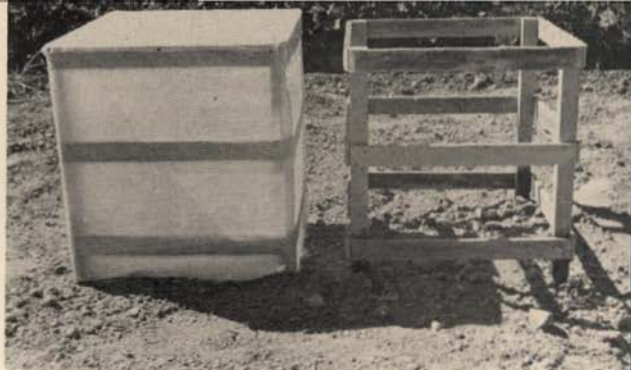
EARLY BLIGHT

Early Blight (fungus) and other foliage blights are seldom of importance on tomatoes irrigated by the furrow method. The early blight fungus is seed-borne and attacks potatoes and other solanaceous hosts. With recent outbreaks of the disease on potatoes grown under sprinklers, the fungus is now wide-spread. Should tomatoes be grown under sprinkler irrigation, early blight will cause defoliation and fruit rots.



Figure 6.—Galls caused by root knot nematode affects many crop and garden plants.

Figure 2.—Idaho cage protects plant from curly top.



Control

Obtain "disease-free" plants grown from hot-water-treated seed and start in pasteurized soil. Remove infected plants and practice rotation.

WILT DISEASES

Wilts (fungi) are caused by two soil-borne fungi, *Fusarium* and *Verticillium*. Beginning with the lower leaves, a gradual yellowing and wilting of foliage occurs. The woody stem and root become brownish in color just below the outer green bark. Plants are stunted and fruit are small. The disease-causing fungi live for many years in the soil.

Control

Prevent introduction of these diseases into the soil. *Fusarium* is the least common wilt in Idaho. No varieties recommended for Idaho are resistant. (Extension Circular No. 102). However, Marbon and Early Baltimore, Rutgers, Norton, and Pritchard are resistant to *Fusarium* wilt. Wilt-resistant Moscow (a suitable tomato for Idaho) is resistant to *Verticillium* wilt.

BLOSSOM END ROT

Blossom End Rot (physiologic) on tomato fruit is first a small water-soaked spot which develops into a large, dark, sunken leathery spot at the blossom end. (See Figure 4). The disease usually occurs because of an insufficient (or irregular) supply of water for both leaves and fruits. The trouble is aggravated by improper fertilizer balance.

Control

Water tomatoes uniformly and regularly, especially during the fruit-setting period. Avoid excessive use of nitrogenous fertilizers. Use water-conserving measures such as shallow cultivation maintaining a surface soil mulch, or mulching plants with straw, sawdust, or manure. Tomato varieties vary in susceptibility; avoid susceptible varieties. Sioux and Owyhee have some resistance.

Control

The new curly-top resistant tomato variety, "Owyhee," recently released by the University of Idaho after many years' research, is the hope of the future for commercial tomato production in Idaho and is recommended for all commercial plantings. For home and local market gardening where susceptible varieties may be used because of personal preference, plant tomatoes early; use hot caps or Idaho cages to protect plants until after the main migration of leafhoppers is over. (See Figure 2). Space transplants closely using 2 to 3 plants per hill. Plant seed directly in the garden row, 4 to 6 weeks before the usual safe date for transplants. Avoid planting tomatoes near beets.

MOSAIC AND STREAK

Mosaic (virus) causes green and yellow mottling and curling of the leaves. This virus survives in weeds and processed tobacco. It is spread chiefly by handling or brushing against plants. **Streak**, a more serious disease, is a combination of common tomato mosaic and one of the potato viruses, which causes dead areas to develop on the stem and leaves of the plant and death of the plants. (See Figure 3).

Control

Obtain or grow healthy plants. Do not smoke or use tobacco while working with seedlings since mosaic virus is carried on smoker's hands. Wash hands with soap and water before handling or transplanting plants. Since there are many weed hosts of mosaics, weeds should be kept down in the vicinity of the plant beds. Cucumbers, melons and potatoes should be kept away from the plant beds. Some progress has been made in developing mosaic-resistant tomatoes, but these are not yet available for production.

BACTERIAL CANKER

Bacterial Canker (seed-borne bacteria) infected plants wilt suddenly without yellowing of leaves. Leaf petioles are firm and green after leaves have turned brown. A cross section of stem often shows a water soaked pith. When pressure is applied to cut stems, or leaf petioles, a grayish slimy exudate appears at the vascular bundles which indicates bacterial canker and helps separate this disease from *Fusarium* and *Verticillium* wilts.



Figure 3.—Tobacco mosaic on tomato.

Figure 5. — Early blight causes leaf spots and fruit rot and may cause severe defoliation when tomatoes are irrigated with sprinklers.



The leaf spots caused by early blight are circular to angular, dark brown, and very small—up to $\frac{1}{4}$ -inch in diameter. Concentric ridges formed in the dead tissue produce a characteristic target effect. Fruits are infected in the green or ripe stage, usually at the stem end or through cracks and wounds. (See Figure 5).

Control

Under western irrigation conditions, the foliage diseases can be controlled by obtaining disease-free plants and by careful regulation of irrigation practices. Do not grow tomato plants under sprinkler irrigation and arrange surface irrigation to avoid excessive wetting of the soil under the plants. Sprays have given effective control in many areas. Zineb and Maneb are suggested fungicides.

FRUIT ROTS

Fruit Rots (fungi) may be caused in Idaho by several fungi, which require moisture on or near the fruit for fungus penetration. The symptoms are usually confined to the fruits. The fruit begins to rot from a crack or a brownish spot often in contact with the soil.

Control

Proper irrigation will help control fruit rots. Arrange irrigation to avoid wetting surface soil. Do not irrigate late in the season. Set plants on ridges or cultivate plants so as to have fruit set on dry ground. Staking or use of wire braces to keep plants off ground will reduce rots. Pick fruit when it is ripe.

ROOT KNOT NEMATODE

Root Knot Nematode causes numerous gall-like swellings on roots. Galls are usually swollen parts of the root and not attached to the side of it like legume nodules appear to be. Plants are often yellowed and stunted. Nematodes attack most vegetables and live for a long time when once introduced into the soil. **Avoid introducing this destructive pest into your soil.** (See Figure 6).

Control

Buy or grow disease-free plants. Dig and destroy all affected roots to prevent spread. Rotate susceptible crops with cereals or corn. Several soil fumigants that will give control on an annual basis are available. Ask your county agent for details.